

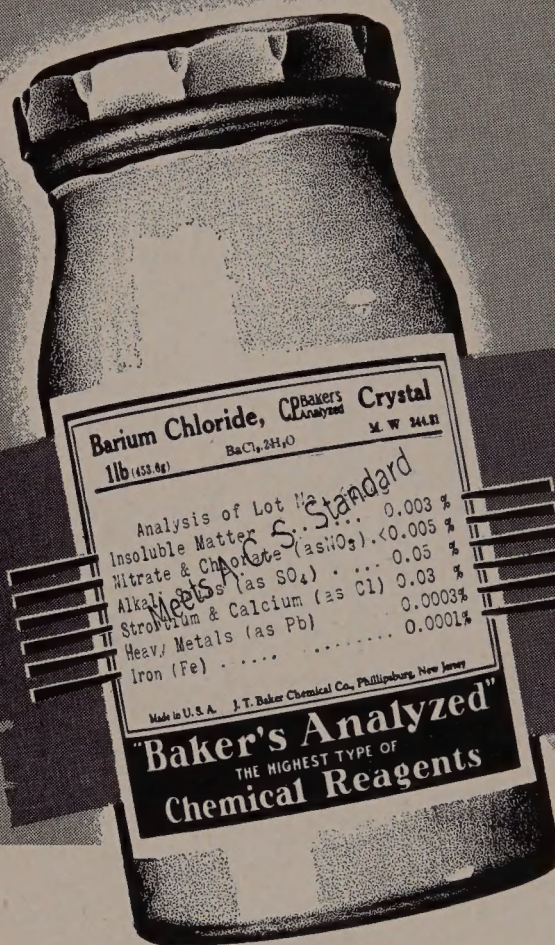
March, 1949

The Chemist Analyst

VOLUME 38

NUMBER 1

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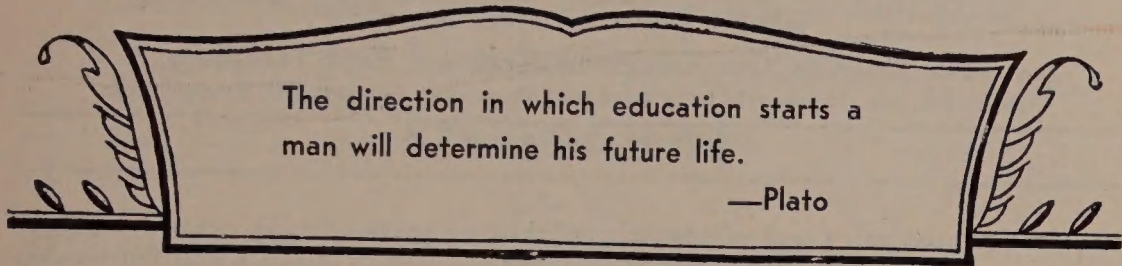
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Table of Contents

	Page
Domestic and Foreign Publications in the Field of Analytical Chemistry	F. S. Boig 3
Rapid Microscopic Method for Identification of Dextrose and Lactose in Mixtures	George L. Keenan 10
Determination of the Attack Characteristics of a Lacquer Coating Upon a Plastic Base	Julius Sirota 11

LABORATORY SUGGESTIONS

Support for Weighing on the Balance	Joseph J. Kolb 15
Laboratory Pressure Filtration	M. M. Luskin 16
Marking Glass Tubing of All Sizes	A. J. Mooradian 16
Sealing Electrodes in Capillary Tubing	Alexander P. Marion 17
Pipette Washing Made Easy	Milton Roth 19
Filtration at Low Temperatures	Vincent C. Petrillo 20
Use of Plastic Containers for Chemical Reactions	Robert B. Dean 20
Apparatus for the Determination of Mineral Oil in Organic Compounds	T. I. Fand 21
Miscellany	24

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THE CHEMIST-ANALYST

MARCH, 1949

VOL. 38, NO. 1

J. T. Baker Chemical Co., Executive Offices and Plant; Phillisburg, N. J.

Subscription rate, 12 issues \$1.00 in U. S. and Possessions. Canada and Foreign \$1.50

S. B. WILDRICK, *Editor*

After almost ten years of steadily advancing prices living costs are at last beginning to go down. From the high point reached in August and September of last year, consumer prices have shown a gradual decline.

Lower prices for certain commodities are being reflected in lower prices to the consumer. Farm commodity prices in January 1949 were 16.3 per cent less than the postwar peak, resulting in lowered prices for meat and butter. Prices for clothing are lower. While building material prices show little change, fuel costs have gone down.

Buying habits have also undergone a change in recent months, as consumer goods have become more plentiful. There is a stronger tendency on the part of the buying public to question prices, and to give careful consideration to values, before purchasing.

Buyers are interested in ways to make a dollar go a little farther—and they want to make sure they are getting good value for their money.

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Domestic and Foreign Publications in the Field of Analytical Chemistry

A Statistical Analysis

F. S. BOIG

Northeastern University, Boston, Mass.

As part of a comprehensive study of the literature of chemistry, necessitating the collection of a tremendous amount of data, it was decided to make a separate statistical analysis of the material collected in the field of analytical chemistry. A similar study for the field of paint and varnish chemistry has already appeared (1).

The purpose of this analysis is to determine the important domestic and foreign publications in the analytical field, the relative number of contributions from each country, and the relative importance of the languages of publication.

In a recent article by Strong (7), a somewhat similar analysis was made as part of a study on the trends in quantitative analysis. The data for the article were collected by making a survey of papers published in the year 1946, from Section 7 in *Chemical Abstracts*, plus some analytical articles abstracted in other sections, and stopped with Number 16 of the 1947 *Chemical Abstracts*.

Method of Collecting Data

The data for this study were taken exclusively from Section 7 of *Chemical Abstracts* for two complete years, 1947 (a postwar year) and 1937 (a prewar year).

The abstracts were searched for number of articles, number of journals, name of journal, country of journal and language of publication of the individual articles. The intention was to compare the data for the two years in question. This information was compiled in three tables.

Classification of Data

Table I comprises the abstracts by journal and lists the twenty most important journals for the two years in question in their relative positions.

Table II comprises abstracts by country and the relative positions of the countries for the two years, along with each country's percentage of the total number of abstracts.

Table III contains data on language of the original articles which were abstracted, the relative importance of the languages of publication and the percentage of the total.

Interpretation of the Data

An examination of Table I, containing the number of abstracts in the individual journals, gives concrete proof that the Analytical Edition of *Industrial and Engineering Chemistry*, now *Analytical Chemistry*, is far out in front as the most important journal. In 1947 it accounted for 13.4

(continued on page 5)

TABLE I. ABSTRACTS BY JOURNAL

Journal	Country	1947		1937	
		No.	Rank	No.	Rank
Ind. Eng. Chem., Anal. Ed.*	United States	129	1	116	2
Zavodskaya Lab.	Russia	63	2	167	1
J. Chem. Soc. Japan	Japan	61	3	17	12
Analyst	England	49	4	37	5
Anales fis. y quim.	Spain	26	5	—	—
Z. Ver. deut. Chem., Beihefte	Germany	20	6	—	—
Compt. rend.	France	19	7	13	18
Mikrochemie ver. Mikrochim. Acta†	Austria	19	8	See note	
Chim. anal. ‡	France	18	9	—	—
Chemist-Analyst	United States	16	10	22	10
J. Applied Chem. (USSR)	Russia	14	11	83	4
Ann. chim. applicata	Italy	13	12	7	—
Bull. soc. chim. France	France	13	13	15	15
Ann. pharm. franc.	France	11	14	—	—
Metallurgia	England	11	15	2	—
Reichsamt Wirtschafts- ausbau Chem. Ber.	Germany	11	16	—	—
Afinidad	Spain	10	17	—	—
J. Optical Soc. Am.	United States	10	18	—	—
Zhur. anal. Khim. (new)	Russia	10	19	—	—
J. Am. Chem. Soc.	United States	8	20	23	9
J. Chem. Education	United States	8	21	14	17
J. Assoc. Offic. Agr. Chemists	United States	7	22	15	16
Z. anal. Chem.	Germany	—	—	114	3
Mikrochim. Acta†	Austria	—	—	34	6
Mikrochemie†	Austria	—	—	33	7
Angew. Chem.	Germany	1	—	25	8
J. Gen. Chem. (USSR)	Russia	3	—	18	11
J. Soc. Chem. Ind.	England	4	—	17	13
Total Number of Abstracts		961		1412	
Total Number of Journals		216		310	

* Now *Anal. Chem.*

† *Mikrochim. Acta* and *Mikrochemie* now combined under the name *Mikrochemie ver. Mikrochim. Acta*.

‡ Formerly *Ann. chim. anal.*

per cent of all abstracts, and 8.2 per cent in 1937 (under its old name). This leadership has been taken from the Russian journal, *Zavodskaya Laboratoriya*, which is now in second place after having led the field in 1937. The new Russian journal, *Zhurnal Analiticheskoi Khimii*, started in 1947, has evidently not yet had time to reach a position of importance, most Russian analytical articles still being published in *Zavodskaya Laboratoriya*.

The third place publication, *Journal of the Chemical Society of Japan*, is not as important as would be indicated, since the number of abstracts (sixty-one) covers the six year period 1941-6 and represents an attempt by *Chemical Abstracts* to catch up with the material unavailable during the war. This journal will probably level off to approximately 20 abstracts per year, as the number for 1937 is 17.

Important Foreign Journals

The important foreign journals are: Russia, *Zavodskaya Laboratoriya*; for Japan, the *Journal of the Chemical Society of Japan*; for England, the *Analyst*; for Spain, *Anales de fisica y quimica*; for Germany, the *Zeitschrift fur analytische Chemie*, which now shows the effects of the war but should be a leading journal again, while *Zeitschrift des Vereins deutscher Chemiker (Beihefte)* was the leading German analytical journal for 1947. In 1937, *Zeitschrift fur analytische Chemie* was in third place from a standpoint of total abstracts. French analytical chemists do not seem to have any one favorite journal, but *Comptes rendus* and *Chimie analytique* (new) have the most analytical articles.

Anyone interested in foreign periodicals dealing with analytical chemistry, from the standpoint of library subscriptions, can tell from Table I the names of the more important ones.

Relative Importance of Individual Countries and Number of Contributions

A study of Table II, a compilation of abstracts by country, reveals that the United States has taken over first position by a comfortable margin, accounting for 26.4 per cent of all abstracts. In 1937 the United States was in third place, behind Russia and Germany. Russia in 1947 was in second place (11.8 per cent of all abstracts), with England in third position. The most notable changes in position during the decade have been: (a) Germany's drop from second to sixth, representing 20 per cent of its normal yearly output before the war; (b) the increase in the number of articles from Spain, Switzerland and Sweden; (c) the sharp falling off of Russian articles to one-third of the 1937 output, which is obviously due to the war and no doubt will increase in the next few years; (d) the above-mentioned increase in the number of articles from the United States; (e) the sharp drop in number of articles from Czechoslovakia and Austria, as might be expected as a result of the war; (f) increased research activity in Brazil, due to the general progressiveness shown by that country in the past few years.

TABLE II. ABSTRACTS BY COUNTRY

Country	1947			1937		
	No.	Rank	%	No.	Rank	%
United States.....	254	1	26.4	240	3	17.0
Russia	113	2	11.8	353	1	25.0
England.....	105	3	11.0	88	4	6.2
France.....	102	4	10.6	87	5	6.2
Japan (1947 includes 5 yrs.)	73	5	7.6	40	7	2.8
Germany.....	51	6	5.3	275	2	19.5
Spain.....	45	7	4.7	10	—	0.7
Switzerland.....	28	8	2.9	15	—	1.0
Italy.....	23	9	2.4	29	8	2.1
Sweden.....	21	10	2.2	9	—	0.6
Austria.....	20	11	2.1	74	6	5.2
Brazil.....	20	12	2.1	6	—	—
Netherlands.....	16	13	1.7	14	—	1.0
Argentine.....	14	14	1.4	9	—	0.6
Belgium.....	13	15	1.3	16	—	1.1
India.....	12	16	1.2	15	—	1.0
Canada.....	11	17	1.1	4	—	—
Australia.....	9	18	0.9	18	10	1.3
Hungary.....	6	19	0.6	15	—	1.0
Denmark.....	5	20	0.5	1	—	—
Roumania.....	4	—	—	6	—	—
Czechoslovakia.....	3	—	—	24	9	1.7
Chile.....	2	—	—	0	—	—
Finland.....	2	—	—	7	—	—
Norway.....	2	—	—	0	—	—
China.....	1	—	—	10	—	0.7
Egypt.....	1	—	—	0	—	—
New Zealand.....	1	—	—	1	—	—
Turkey.....	1	—	—	1	—	—
Uruguay.....	1	—	—	2	—	—
Peru.....	0	—	—	10	—	0.7
Poland.....	0	—	—	9	—	0.6
Bulgaria, Greece, each	0	—	—	4	—	—
South Africa.....	0	—	—	3	—	—
Ecuador.....	0	—	—	2	—	—
British Guiana, Estonia, each	0	—	—	1	—	—
Undetermined.....	2	—	—	9	—	0.6

It will be noticed that Japan shows a large increase in number of abstracted articles—however, the position is unwarranted, since the 1947 abstracts were composed of articles covering a span of six years, due to the remarkable work of *Chemical Abstracts* in obtaining material inaccessible during the war (see *Chem. Eng. News*, **26**, 551 (1948)).

TABLE III. LANGUAGE OF ORIGINAL ARTICLES

Language	1947			1937		
	No.	Rank	%	No.	Rank	%
English.....	420	1	43.8	398	1	28.2
French.....	141	2	14.7	126	4	8.9
Russian.....	109	3	11.3	344	3	24.4
German.....	80	4	8.4	348	2	24.6
Japanese.....	67	5	7.0	34	5	2.4
Spanish.....	62	6	6.5	33	6	2.3
Italian.....	23	7	2.4	29	7	2.1
Portuguese.....	20	8	2.1	6	14	0.5
Swedish.....	16	9	1.7	7	12	0.5
Dutch.....	8	10	0.8	10	10	0.8
Hungarian.....	6	11	0.6	15	9	1.2
Czech.....	2	—	—	20	8	1.4
Danish.....	2	—	—	1	—	—
Norwegian.....	2	—	—	0	—	—
Finnish.....	1	—	—	6	13	0.5
Polish.....	0	—	—	7	11	0.5
Roumanian.....	0	—	—	5	15	0.4
Ukrainian.....	0	—	—	5	16	0.4
Bulgarian.....	0	—	—	3	17	0.2
Chinese.....	0	—	—	3	18	0.2
Greek.....	0	—	—	2	19	—
Turkish.....	0	—	—	1	—	—
Undetermined.....	2	—	—	9	—	0.6

Relative Importance of Language of Publication

Consideration of Table III, which has the number of abstracts compiled according to language of original article, shows that the English language has increased its leadership in the past ten years, accounting for 43.8 per cent of all abstracts as against 28.2 per cent in 1937. French has progressed from fourth to second place, exchanging positions with German, while Russian remains in third place in spite of a drop from 24.4 per cent of all articles in 1937 to a mere 11.3 per cent in 1947. One outstanding feature is that the total number of abstracts has fallen off from 1412 to 961, or 68 per cent of the

1937 output—very obviously due to wartime conditions. The fifth place position of Japanese in 1947 is not normal for reasons already given, since the number of abstracts covers a six year period. Very noticeable is the number of articles in Spanish for 1947, almost double the 1937 figure, which upon examination seems to be because of increased research (or coverage) in Spain itself rather than in Spanish speaking countries.

In comparing this data with the data in the article by Strong (7), it will be noticed that there are certain points of disagreement. First, this article is based upon 961 abstracts (1947) as against 1336 for 1946; however, data for this article were taken from the abstracts published in 1947 *Chemical Abstracts* and from the analytical section only, while Strong's data include papers written in 1946 and include material in sections other than the analytical. Second, the data in this study show Russian to be second in importance as a foreign language, while Strong's data show that it is the most important foreign language. This disagreement is no doubt due to the different manner in which the data were collected. Both articles would agree, however, that a knowledge of the Russian language would be a distinct help to an analytical chemist.

Possible Trends in the Future

As far as individual publications are concerned, no doubt there will be very little change in the English language publications as they all seem to be very firmly established. Probably the Russian *Zhurnal Analiticheskoi Khimii* will steadily grow as a specialized journal, absorbing analytical material from *Zavodskaya Laboratoriya* and several of the Russian journals of lesser importance. The *Journal of the Chemical Society of Japan* will undoubtedly lose third place among the world journals, when considered on a yearly basis. The German *Zeitschrift für analytische Chemie* will no doubt resume a position of importance, although it will probably not succeed in attaining its former position. The same will probably hold true for Austria and its *Mikrochemie vereinigt mit Mikrochimica Acta*.

As far as language is considered, the English language will no doubt continue its supremacy, followed by French, Russian and German. Russian may become second in importance, as it has shown a steady growth and is fast recovering from the effects of the war; also, the coverage by *Chemical Abstracts* is more complete, and it also seems that analytical work is a favorite of the Russian chemist (a desire by the Russian government to develop natural resources is no doubt a primary reason). The growing spirit of nationalism in Russia will also probably result in more of the Russian journals being printed exclusively in Russian, at the expense of French and German.

It appears to be questionable whether the German language will resume its former position in the realm of chemistry. A sharp decline resulted in the number of German articles printed after the first world war (4), requiring eight years to attain its former position of importance. It may be that this time the recovery will be more rapid. As a matter of record, according to Crane (5), recovery from World War II has in general been more rapid than after the first World War, and there is already to be noted a sharp rise in chemical publication, due wholly or in part to an increased interest in scientific research.

Summary

This article represents a statistical analysis of the abstracts published in the Analytical Section of *Chemical Abstracts* for the years 1937 and 1947. The information obtained was examined to determine the important domestic and foreign publications in the field of analytical chemistry, the relative importance of the various contributing countries, and the relative importance of the languages of publication. Results show the changes over the past decade, and point out the possible trends in the future in respect to the publications in the field of analytical chemistry, from the standpoint of country, language and status of research. A study of the languages of publication shows English in the lead, followed by French, Russian and German in that order.

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- (7) Strong, F. C., *Anal. Chem.* **19**, 968-71 (1947).

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Rapid Microscopic Method for Identification of Dextrose and Lactose in Mixtures

GEORGE L. KEENAN

Formerly Microanalyst, Food and Drug Administration*

In the course of the examination of food and drug products, attention was drawn to the marked difference in the crystalline habit of dextrose and lactose hydrates. Frequently it is a precarious procedure to place too much reliance on the form of crystals for diagnosis, but dextrose and lactose are instances in which the difference in the habit is reliable and other micro-qualitative tests can be rapidly made to ensure a doubly positive confirmation. For the information of the analyst, attention first will be called to the distinctive habits, principally by actual illustrations, followed by a description of a short method as an additional identity test; finally attention will be called to the application of the immersion method as another means of identification, if found necessary.

Procedure

In the case of powder mixtures where water-soluble crystalline material may be present, it is desirable to use something like mineral oil (Nujol type) as a menstruum. The material having been placed in this medium on an object slide and a coverslip applied, microscopic examination of lactose at approximately 100 diameters will show material characterized by dart-shaped crystals as illustrated in Fig. 1. This habit is typical and can be relied upon

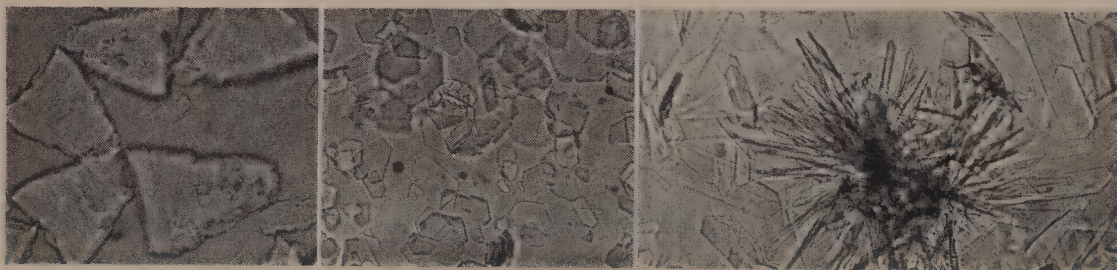


Fig. 1.—Lactose hydrate.

Fig. 2.—Dextrose hydrate.

Fig. 3.—Dextrose hydrate cluster, honey.

in diagnosis. Dextrose, on the other hand, shows a typical form consisting of hexagonal plates as illustrated in Fig. 2. In the case of strained honey that has "sugared out" or has become "grainy" or filled with flecks due to standing in storage for some time, the hexagonal plates may become elongated or hemimorphic, also occurring in clusters as illustrated in Fig. 3.

For additional confirmation, if necessary, rapid identification of the substance as a reducing sugar can be made. It has been found convenient to use solid reagents instead of solutions (such as Fehling's or Benedict's modification). To the material in a water drop on an object slide, a small fragment of citric acid is added and dissolved in the preparation. This is followed in

* Present address: Strongsville, Ohio.

order by similarly sized fragments of sodium hydroxide, sodium bicarbonate, and finally crystalline copper sulfate, all dissolved separately in the test-drop. The object slide is gently heated on the hot-plate, whereupon the usual brick-red precipitate of cuprous oxide will come down.

An additional confirmatory test can be made by application of the immersion method with the chemical microscope. If the analyst is familiar with this technic, the refractive indices of these two sugars are distinctly different and can be readily determined by examination microscopically in oily liquids of the appropriate index. A comparison of the refractive indices of the two sugars is shown in the following table:

Index	Dextrose hydrate	Lactose hydrate
α minimum	1.521	1.542
β intermediate	1.528	1.572
γ maximum	1.549	1.585

Summary

Attention has been called to rapid microscopic methods for the identification of the two commonly occurring commercial sugars, dextrose and lactose, emphasis being placed on (a) significant habits of crystals, (b) microchemical characterization as reducing sugars with solid reagents, and (c) determination of the principal optical constants (refractive indices) with the chemical microscope.

Determination of the Attack Characteristics of a Lacquer Coating Upon a Plastic Base

JULIUS SIROTA

Cathodium Metallizing Company, New York City

A major process for metallizing nonmetallics, such as plastic substances, frequently necessitates the application of lacquers upon the surface both prior and subsequent to the deposition of a thin metal mirror film. These lacquers serve the dual purpose of smoothening the original surface and protecting the metallized surface.

An important feature required of these lacquers is that they possess optimum adhesion and hardness with minimum attacking characteristics upon a base material of similar nature. This is not too easily achieved, when one notes—as pointed out—that the base material is of a similar nature and that the deposited metal film is thin enough to be considered negligible as a barrier toward attack.

(concluded on page 14)

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Baker's Analyzed

The slightest attack upon the base material is evidenced by a distortion of the mirror film with subsequent effect upon its angular reflectivity. This observation forms the basis of the present method for determining the attack characteristics of a lacquer coating upon a plastic or lacquer base.

The term "lacquer" is to be interpreted in the broadest manner possible and to include related "lacquer-type" coatings. However, the method is obviously restricted to the use of clear or transparent coatings.

The method consists of depositing a thin silver mirror upon the base surface and then applying the lacquer to be tested. Any distortion of the reflective surface serves as a qualitative indication of attack and the degree of distortion serves as a semiquantitative indication.

The silver mirror can be deposited in any number of ways (1, 2), but the procedure (3) utilizing a modified Brashear solution is recommended. Essentially, it consists of cleaning the surface, sensitizing it with a stannous chloride dispersion and silvering with a mixture of a silver nitrate solution combined with a reducing agent like dextrose. The method can be made fairly quantitative by considering the following:

If the surface to be tested is the original plastic base material, several uniform samples of constant area are taken, silvered and allowed to dry. All but one are then dipped or sprayed with the various lacquers to be tested, using a standard method for all the test pieces. These are allowed to dry. Using a reflectometer, the reflectivity of the control or unlacquered piece is set at 100% and the per cent angular reflectivities of the lacquered test pieces are read off. The test pieces showing the greatest attack will give the least per cent reflectivity.

The reflectivity effect due solely to the lacquer coating is negligible when compared to the silvered pieces. However, it can be taken into account by lacquering a nonsilvered test piece and comparing its reflectivity with the reflectivity of the original nonsilvered and unlacquered test piece.

The second case that arises involves first the application of a "base lacquer" to the original plastic surface prior to the silvering and application of the top lacquer. This "base lacquered" surface is treated in a similar manner.

This procedure has been found to work quite successfully and in a quantitative manner directly applicable to the industrial problem of lacquer attack. In fact, a form of attack that blends the applied lacquer and base material into one smooth coating and which normally goes unseen, is easily detected by the intermediate silver film.

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- (1) National Bureau of Standards, "The Making of Mirrors by the Deposition of Silver on Glass," Publication C 389.
- (2) Silverman, A., and Howe, R. M., *J. Ind. Eng. Chem.*, **9**, 1032 (1917).
- (3) Rubenstein, M., *Metal Finishing*, **46**, No. 11, 52 (Nov. 1948).

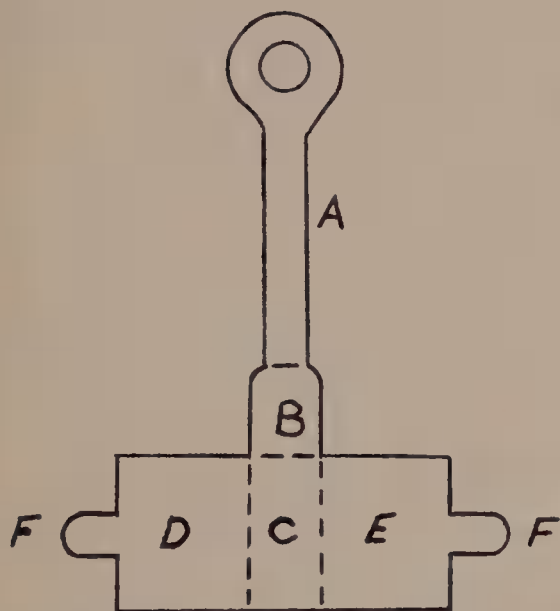
Laboratory Suggestions

Support for Weighing on the Balance

JOSEPH J. KOLB

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Objects such as test tubes, centrifuge tubes, micro Kjeldahl flasks, stemmed fritted-glass filtering funnels and the like, that cannot stand on the balance pan of their own right, are a chore to weigh. This difficulty has been met in the past by using a wire with a slip noose; however, such wires are good for only a dozen or so weighings before they break.



We have made a weighing accessory which, after being used more than 275 times, has lost only 1.4 mg. in weight and is still in use. A piece of stainless steel or half hard aluminum 0.025" thick was cut to the shape, illustrated in full scale, and bent in the following manner along the dotted lines. *B* is bent backward to form an angle of 90° with *C*, *A* is bent upward to form an angle of 90° with *B*, *D* and *E* are bent forward to form angles of about 35° with *C*. The ears *F* are bent back to form loops. One end of a coiled spring, such as used on the brushes of $\frac{1}{3}$ H.P. electric motors, is securely attached to the left ear by complete closure of the loop, the other end

of the spring being left free for temporary attachment to the right ear while weighing.

The object to be weighed is placed in the broad bottomed "V" with its long axis parallel to *C*, the spring is placed over its curved body, and the free end of the spring is looped over the other ear. The sling with its supported load is then hung by its eyelet upon the hook of the balance and weighed.

Laboratory Pressure Filtration

M. M. LUSKIN

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Separation of crystals from mother liquor by means of a Büchner funnel and suction filtration often proves to be troublesome or undesirable. Such is the case when the solvent in the mother liquor evaporates rapidly at the vacuum attained in the suction flask, or when evaporation of the solvent forms a viscous layer on the surface of the filter paper which impedes the filtration. Under these conditions, pressure filtration becomes an advantageous method of separation.

In use at our laboratory is a quick-closing pressure filter, capable of handling Büchner funnels from the smallest to the No. 4 size. It was constructed from a "Mirromatic" 4-quart pressure pan by drilling in the bottom of it a tapered hole to fit the rubber stopper used on the Büchner funnel. The safety disc in the cover was replaced with a $\frac{1}{4}$ " pipe plug, and the orifice in the center of the cover was replaced with a $\frac{1}{8}$ " pipe nipple. This nipple was piped to a union, flexible hose, pressure relief valve set at 25 p.s.i.*, a pressure regulator and a 40 p.s.i. air pressure line.

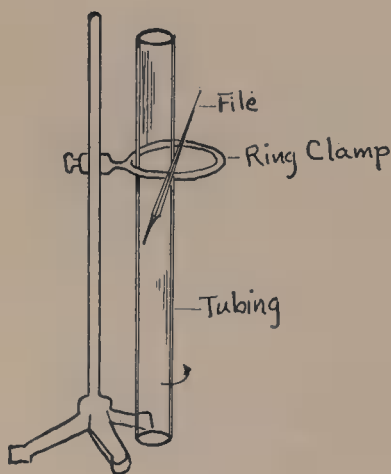
In use, the Büchner funnel with filter paper is placed in the pan, the magma is poured into the funnel, the cover of the pan is turned into position, and the union is connected finger-tight before air pressure is applied. Normally, 20 p.s.i. is used in our laboratory. After filtration, the pressure is gently released by opening the union. The cake may then be washed by adding a suitable wash liquor to the funnel and again filtering under pressure.

* Pounds per square inch.

Marking Glass Tubing of All Sizes

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The cutting of glass tubing having a diameter greater than 1 cm. usually requires a complete circular scratch around the entire tube. This may be neatly and effectively done by the use of an iron stand, a triangular file and a ring clamp of suitable size. The ring clamp is adjusted to the height required. The file is placed across the ring as shown and is made to bear on the tube while the tube is being rotated with the free hand.

Sealing Electrodes in Capillary Tubing

ALEXANDER P. MARION
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An apparatus and technique, which can be used to seal fine platinum wire electrodes into thin-walled capillary tubing, is described in this note. No claim for originality is made since the basic principle is that employed in some quick-heat soldering guns, namely, the heating element is made the secondary of an electrical transformer.

A transformer, whose primary was rated at approximately 100 watts, was stripped of its secondary windings. Since the new secondary was expected to deliver about 75 amperes without breaking down, the need for heavy construction became apparent. Both a heavy, sheet-copper strap and a cable made of five, uncovered, No. 12 wires worked satisfactorily. The number of turns was adjusted to furnish about 0.8 volt under full load.

Across this secondary was fastened a platinum wire, about 0.03 cm. in diameter and about 3 cm. long, bent into a sharp pointed "V". (Although "Nichrome" and copper wires were also tried, the best results were obtained with the platinum.) The temperature of this wire was controlled by varying the voltage supplied to the primary by means of an autotransformer.

When the platinum wire was at red heat, contact was made between the tip of the "V" and the spot on the thin-walled capillary where the electrode was to be inserted. On withdrawing the capillary a small "tail" of glass resulted; this was broken off and the tubing was gently filed to give an orifice of the required size. The electrode wire was introduced, the region warmed over the hot wire, and a small globule of glass (formed by melting the end of a glass thread or capillary over the hot wire) was touched to the orifice. Cautious reheating completed the seal.

This apparatus is not intended for continuous use, as the large secondary current heats up the transformer and predicates a cooling off period. But periods of operation varying from five to ten minutes have had no detrimental effect upon the transformer.

We invite contributions of articles for publication in "The Chemist Analyst," short original articles on methods of analysis or laboratory suggestions (not over 600 words). We shall be glad to pay contributors for all articles that we can use.



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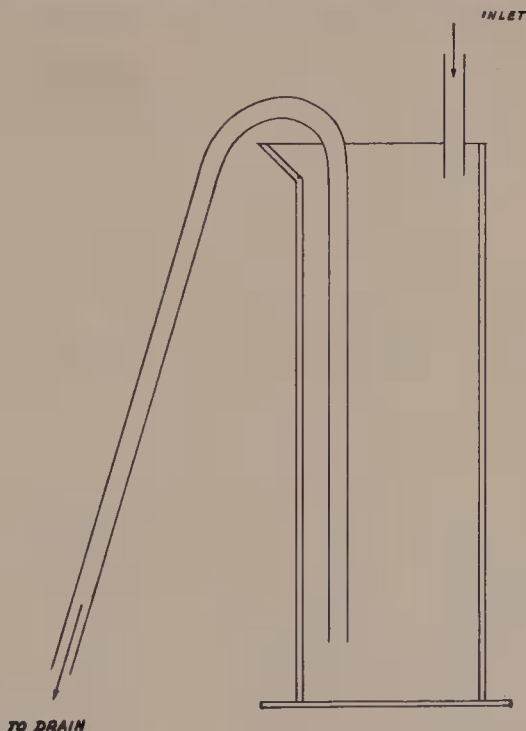
MILTON ROTH

Burroughs Wellcome & Co., Tuckahoe, N. Y.

In a previous number of this journal (1), a pipette washer was described which was claimed to be easily assembled from inexpensive standard equipment. This idea has been carried still further in our laboratory so that now the only equipment required is a large cylinder.

An illustration of the apparatus is given in the diagram. A one-liter graduated cylinder was found satisfactory for completely immersing up to 10 ml. transfer pipettes. A rubber or cotton pad on the bottom of the cylinder will permit the pipettes to be dropped in without danger of breaking.

The apparatus should be set up in a corner of the sink, since a slight overflow is inevitable before the siphon starts functioning. The siphon itself is made of glass or rubber tubing of about 8 to 10 mm. inside diameter. The pouring lip of the cylinder should be pointed towards the lowest part of the sink, *i. e.*, the drain, into which the long arm of the siphon should extend.



To operate the washer, tap water is run in continuously at the rate of about 100 ml. per 15 seconds. At this rate the water will rise simultaneously inside and outside the pipettes. For the most efficient washing, the pipettes should be inserted with the tip up. Obviously, pipettes that are longer than the cylinder can be removed after a suitable period, inverted and replaced.

For cleaning, the cylinder may be filled with a suitable cleaning solution, *e. g.*, "Alconox", obtained from the Standard Scientific Supply Company of New York, in which the pipettes are allowed to soak. Then the rinsing operation is allowed to operate through fifteen or twenty cycles, and finally the pipettes are removed and washed individually with distilled water.

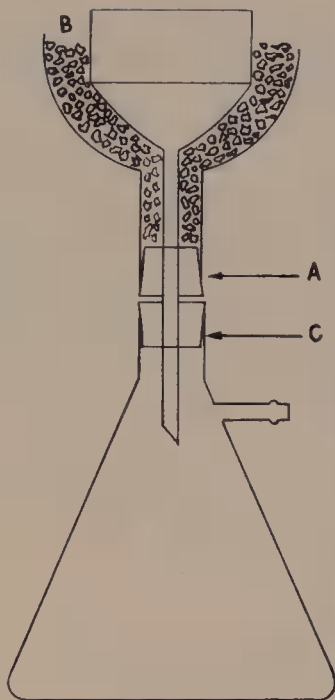
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Filtration at Low Temperatures

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The need sometimes arises, especially in organic preparative work, for filtering at a low temperature. Herein is described an apparatus that is readily made, convenient to use and quite inexpensive.

A suitable vessel for holding the cooling medium can be made from a flask or bottle by cutting off the bottom with a hot wire and removing the sharp edges of the cut. The rubber stopper, *A*, accommodates a Büchner or 60° funnel. Another rubber stopper, *C*, fits the mouth of the suction flask.

Small lumps of dry ice, alone or in combination with an organic solvent depending on the temperature desired, are added at *B*. And the top of the funnel is covered with a watch glass containing some of the cooling medium. After the system has cooled, it is ready for the filtration.

Use of Plastic Containers for Chemical Reactions

ROBERT B. DEAN

University of Oregon, Eugene, Oregon

A number of plastic containers suitable for chemical purposes have recently appeared in the retail markets, but their advantages have not been realized by the majority of chemists. Vessels made of either polystyrene or polythene are suitable for a wide variety of chemical reactions which do not require application of heat or the use of nonaqueous solvents. These materials are available in the form of tumblers and as covered boxes designed for the storage of foods in refrigerators. Several dairies now supply cottage cheese in covered polystyrene boxes, 4" × 4" × 2½" high, which are extremely convenient and inexpensive; the net cost is about half that of a Pyrex beaker of similar capacity.

These containers are superior to glass for preparation and use of strongly alkaline solutions, especially when silica should be absent. A 400-ml. glass beaker may lose a gram in weight when used to make up 50% sodium hydroxide. And solutions of quaternary ammonium hydroxides cannot be kept free from alkali metals in glass containers.

The polystyrene boxes are also excellent for any system requiring a close fitting cover. They can be used as small desiccators if a rack is installed in the bottom. And they have been found particularly useful for a set of small

hygrostats with various constant humidities. For example, a saturated salt solution with excess salt in the bottom maintains constant humidity, and the lid fits tightly enough to effectively limit access of moisture to or from the atmosphere.

Labels may be attached to polystyrene with rubber cement, but they cannot be removed without "frosting" the surface. The frosted surface produced by exposing the plastic to the vapors of benzene or xylene is, however, a very suitable surface for marking with pencil. The pencil marks may be erased when necessary.

Neither polystyrene nor polythene (a soft translucent plastic) should be heated, as the vessels will lose their shape. Polythene is more resistant than polystyrene to hydrocarbon solvents (and chlorinated solvents) but will absorb aromatic hydrocarbons. Ester and ketone solvents should be tested before being used in vessels made of these plastics. They are completely resistant to the action of virtually all aqueous systems; even concentrated acids and alkalies are without effect.

Apparatus for the Determination of Mineral Oil in Organic Compounds

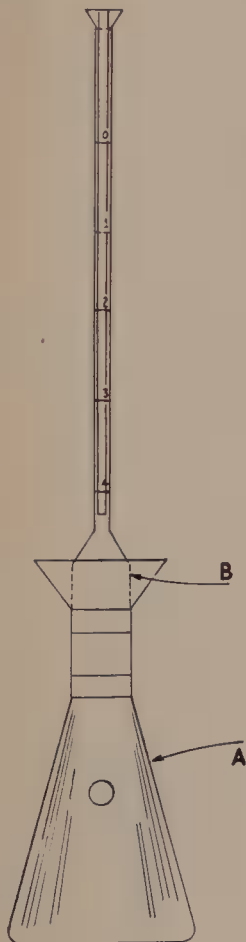
T. I. FAND

Nepera Chemical Company, Inc., Nepera Park, Yonkers, N. Y.

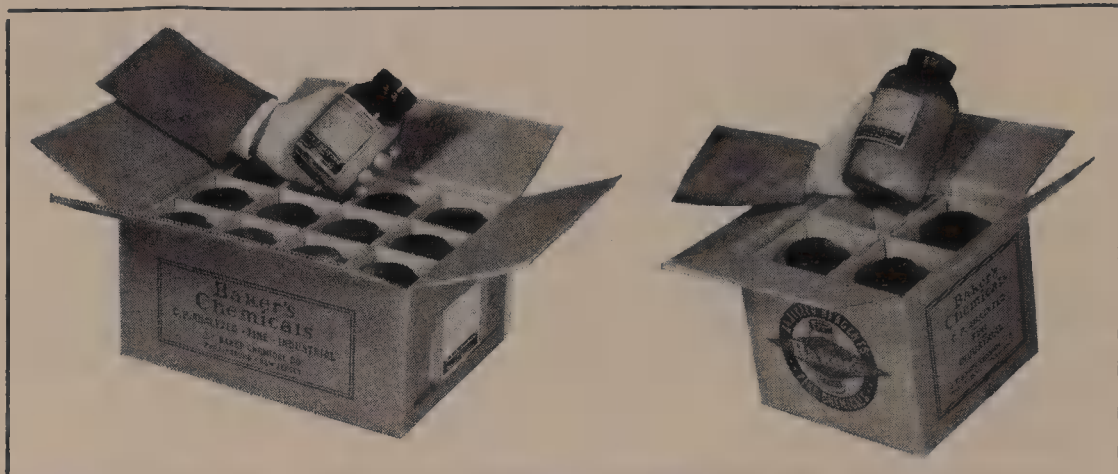
In the manufacture of organic chemicals, mineral oil is sometimes used as the reaction medium. In spite of subsequent purification a small amount of mineral oil remains in the finished product. Therefore a limitation on the amount of oil is generally included in the specifications, *e. g.*, 0.5 ml. of oil per 100 g. of product.

The apparatus illustrated here has been used for this determination and may be constructed from common laboratory equipment. *A* is a 250 ml. iodine absorption flask. *B* is a 24/40 standard taper male joint to which is sealed a 5 ml. pipette, graduated in tenths of a milliliter.

The following procedure is applicable only when the organic compound can be taken into solution without dissolving the mineral oil. One hundred grams of the compound is transferred to the flask and either concentrated HCl, a 40% solution of NaOH or water (depending upon the solubility of the organic product) is slowly added with shaking until the crystals are completely dissolved and the level of the solution is just below the neck of the flask. Then the solution is cooled to room temperature, the joint *B* lubricated with Silicone grease and the pipette tightly inserted in the flask. Finally, additional solvent is slowly added through the flared end of the pipette until the layer of oil has been brought into the graduated portion of the pipette. The volume of this oil is then estimated from the pipette calibrations.



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Miscellany

Preventing the Corrosion of Electric Light Bulbs by Laboratory Fumes

F. A. BAEZ

Control Laboratory of the Lennig Division, Rohm & Haas Company,
Philadelphia, Penna.

In recent years difficulty has been encountered in removing electric light bulbs from the sockets, due probably to the corrosion of the brass bases of the lamps by laboratory fumes. After being in use for any length of time, attempts to remove the lamp usually result in twisting the glass bulb out of the metal base. Removing the lamp from the socket is always tedious, and in a few cases it has necessitated replacement of the receptacle.

During recent months we have been applying a liberal coating of Silicone lubricant to the brass base of the lamp before inserting it in the socket. Since then removal of electric light bulbs has not been troublesome.

Prevention of Bumping

JOSEPH D. GRANDINE, 2nd

University of Southern California, Los Angeles, Calif.

A small sliver or shred of polytetrafluoroethylene, sold by E. I. du Pont de Nemours & Company, Inc., under the trade name of "Teflon," makes an excellent boiling chip for the prevention of "bumping" during evaporation operations in the laboratory. This material is chemically inert to nearly all known reagents (including fluorine and hydrogen fluoride) and is nonporous in nature. Gas bubbles form very readily on its surface, and this property does not disappear on continued use and reuse in aqueous solutions or organic solvents. Its extreme chemical inertness and nonabsorbent properties make it particularly valuable in evaporations during analytical procedures, where other materials may be prohibited because of their chemical activity or physical adsorption of material from solution. A small sample of "Teflon" will furnish enough boiling chips for an indefinite period of time.

STEP 1



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STEP 2



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STEP 3



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